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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/695,852

10/29/2003

Kimihito Matsumoto

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EXAMINER

IWASHKO, LEV

ART UNIT

PAPER NUMBER

2186

DATE MAILED: 05/02/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/695,852

Applicant(s)

MATSUMOTO ET AL.

Examiner

Lev I. Iwashko

Art Unit

2186

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 3/10/2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-14 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-14 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 29 October 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>10/29/2003</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Acknowledgement

1. Acknowledgment is made of applicant's claim for foreign priority under 35 U.S.C. 119(a)-(d). The certified copy has been filed in parent Application No. JP 2002-316453, filed on October 20, 2002

Response to Amendment

2. As shown above, proper acknowledgement of the receipt of priority documents has been completed.
3. Examiner is unaware of any allowable subject matter in Claim 11. There was no identification of allowable subject matter in the entire office action.
4. The Applicant did not include an amended list of claims. Therefore, no weight could be given to the Applicant's alleged cancellation of Claim 11 and its incorporation in claims 1-3.
5. Claims 1-14 stand rejected.

Claim Rejections - 35 USC § 102

6. The following are quotations of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. Claims 1-14 are rejected under 35 U.S.C. 102(b) as being anticipated by Melchior (US Patent 6,226,710)

Claim 1. A content-addressable memory comprising:

- a storage section having a plurality of storage areas (*Column 11, lines 11-13 – State that RAM may be partitioned into 8096 independent CAM tables*)
- for storing therein a plurality of pieces of information, (*Column 11, line 19 – State that the tables store keys and associations*)
- the storage areas having respective priority ranks assigned thereto; (*Column 12, lines 48-50 – State that a “configuration is automatically selected to minimize the number of key words that need to be read for a seek”. In other words, they are ranked in priority*)
- an ancillary storage section having a plurality of ancillary storage areas for storing therein the priority ranks, the plurality of ancillary storage areas being associated with the plurality of storage areas, respectively; (*Column 13, lines 42-46 – State that “configuration data” (a.k.a. priority ranks) is kept in “registers” (a.k.a. ancillary storage)*)
- and a controlling section for outputting, when at least one of the storage areas stores therein information matching with a word supplied from an exterior, pointer(s) of all or part of the at least one of the storage areas in descending order of priority ranks that are stored in ancillary storage area(s) associated with the at least one of the storage areas. (*Column 16, lines 16-20 – State that the “CAM engine” (a.k.a. controlling section for outputting) will output its configuration word to the data bus and will sequentially output its RAM word within the range of the configuration. Column 13, lines 42-46 – State that “configuration data” (a.k.a. priority ranks) is kept in “registers” (a.k.a. ancillary storage)*)

Claim 2. The content-addressable memory according to claim 1, further comprising a priority setting section for creating sequential priority ranks in order in which the plurality of pieces of information are stored in the plurality of storage areas, and for storing the created priority ranks in ancillary storage areas associated with the storage areas, respectively. (*Column 16, lines 16-*

20 – State that the “CAM engine” will output its configuration word to the data bus and will sequentially output its RAM word within the range of the configuration. Column 13, lines 42-46 – State that “configuration data” (a.k.a. priority ranks) is kept in “registers” (a.k.a. ancillary storage))

Claim 3. The content-addressable memory according to claim 1, wherein the storage section is supplied in serial (*Figure 2, Diagram 108 – Shows that the storage section is supplied in serial*)

- with the plurality of pieces of information from an exterior, and stores the supplied pieces of information in the plurality of storage areas in sequence. (*Column 16, lines 16-20 – State that the “CAM engine” (a.k.a. controlling section for outputting) will output its configuration word to the data bus and will sequentially output its RAM word within the range of the configuration*)

Claim 4. The content-addressable memory according to claim 1, wherein the ancillary storage section is supplied in serial with the priority ranks assigned to the storage areas, and stores the supplied priority ranks in the plurality of ancillary storage areas in sequence. (*Column 16, lines 27-33 – State that the configuration will match exactly to the configuration of the table previously unloaded, and the CAM engine will store the each word passed in the load in consecutive words of the current table*)

Claim 5. The content-addressable memory according to claim 1, further comprising a priority converting section for converting the priority ranks stored in the ancillary storage areas into unique priority ranks (*Column 14, lines 24-31 – Describe the process of the “set context to existing table”. This process identifies the RAM table that has context, and also changes the context to perform record operations on a different table*)

- indicating an order in which the plurality of pieces of information are to match with a common word supplied from an exterior. (*Column 13, lines 46-49 – State that “the configuration data for the remaining*

tables are kept in the off-chip memory”, which means that there is an exterior from which common words are supplied)

- Claim 6. The content-addressable memory according to claim 3, further comprising a priority converting section for converting the priority ranks stored in the ancillary storage areas into unique priority ranks (*Column 14, lines 24-31 – Describe the process of the “set context to existing table”. This process identifies the RAM table that has context, and also changes the context to perform record operations on a different table*)
- indicating an order in which the plurality of pieces of information are to match with a common word supplied from an exterior. (*Column 13, lines 46-49 – State that “the configuration data for the remaining tables are kept in the off-chip memory”, which means that there is an exterior from which common words are supplied)*)
- Claim 7. The content-addressable memory according to claim 4, further comprising a priority converting section for converting the priority ranks stored in the ancillary storage areas into unique priority ranks (*Column 14, lines 24-31 – Describe the process of the “set context to existing table”. This process identifies the RAM table that has context, and also changes the context to perform record operations on a different table*)
- indicating an order in which the plurality of pieces of information are to match with a common word supplied from an exterior. (*Column 13, lines 46-49 – State that “the configuration data for the remaining tables are kept in the off-chip memory”, which means that there is an exterior from which common words are supplied)*)
- Claim 8. The content-addressable memory according to claim 5, wherein:
- each of the priority ranks contains ancillary control information indicating a condition to be satisfied between the stored information in the plurality of storage areas and pointers of the storage areas; (*Column 15, lines 40-49 – State that the CAM engine checks for a*

match between the key presented and the stored key, and there is a segment base address involved)

- and the priority converting section converts each of the priority ranks stored in the ancillary storage areas into a priority rank which satisfies the condition contained in the ancillary control information. *(Column 14, lines 24-31 – Describe the process of the “set context to existing table”. This process identifies the RAM table that has context, and also changes the context to perform record operations on a different table)*

Claim 9. The content-addressable memory according to claim 6, wherein:

- each of the priority ranks contains ancillary control information indicating a condition to be satisfied between the stored information in the plurality of storage areas and pointers of the storage areas; *(Column 15, lines 40-49 – State that the CAM engine checks for a match between the key presented and the stored key, and there is a segment base address involved)*
- and the priority converting section converts each of the priority ranks stored in the ancillary storage areas into a priority rank which satisfies the condition contained in the ancillary control information. *(Column 14, lines 24-31 – Describe the process of the “set context to existing table”. This process identifies the RAM table that has context, and also changes the context to perform record operations on a different table)*

Claim 10. The content-addressable memory according to claim 7, wherein:

- each of the priority ranks contains ancillary control information indicating a condition to be satisfied between the stored information in the plurality of storage areas and pointers of the storage areas; *(Column 15, lines 40-49 – State that the CAM engine checks for a match between the key presented and the stored key, and there is a segment base address involved)*

- and the priority converting section converts each of the priority ranks stored in the ancillary storage areas into a priority rank which satisfies the condition contained in the ancillary control information. *(Column 14, lines 24-31 – Describe the process of the “set context to existing table”. This process identifies the RAM table that has context, and also changes the context to perform record operations on a different table)*

Claim 11. The content-addressable memory according to claim 1, wherein the plurality of storage areas and the plurality of ancillary storage areas are a set of common storage areas in each of which a single piece of information and a priority rank are stored in a pack, *(Figure 3 – Shows that the RAM indeed is partitioned into common storage areas with packs of information)*

- the single piece of information and the priority rank being associated with each other. *(Column 16, lines 16-20 – State that the “CAM engine” will output its configuration word to the data bus and will sequentially output its RAM word within the range of the configuration. In other words, there is association between the info and the priority rank)*

Claim 12. The content-addressable memory according to claim 11, wherein each of the common storage areas is a set of partial storage areas to which data is written individually. *(Figure 3 – Demonstrates the set of partial storage areas to which data is written individually)*

Claim 13. The content-addressable memory according to claim 1, wherein:

- control information is appended to each of the priority ranks stored in the plurality of ancillary storage areas, the control information indicating a processing which the controlling section is to perform; *(Column 16, lines 63-67 – States that “the RAM control function provides RAM read and write services for all other CAM engine processes”)*

- and the controlling section determines which one of the ancillary storage areas is associated with one of the storage areas which stores therein information matching with the word supplied from an exterior, *(Column 16, lines 27-33 – State that the CAM engine will store the each word passed in the load in consecutive words of the current table. Column 13, lines 46-49 – State that “the configuration data for the remaining tables are kept in the off-chip memory”, which means that there is an exterior from which common words are supplied)*
- and performs a processing indicated by control information which is stored in the determined ancillary storage area. *(Column 16, lines 63-67 – States that “the RAM control function provides RAM read and write services for all other CAM engine processes”)*

Claim 14. The content-addressable memory according to claim 13, wherein the control information contains at least one of a criterion, the number of pointers to be output, and a type of the pointers, *(Column 12, lines 52-59 – State that the CAM engine receives a “configure new table” command from the host, and there is an associated 32-bit linked association pointer)*

- the criterion being for judging whether the stored information in the plurality of storage areas match with the word supplied from the exterior. *(Column 16, lines 16-20 – State that the “CAM engine” (a.k.a. controlling section for outputting) will output its configuration word to the data bus and will sequentially output its RAM word within the range of the configuration. Column 13, lines 42-46 – State that “configuration data” (a.k.a. priority ranks) is kept in “registers” (a.k.a. ancillary storage))*

Response to Arguments

8. Applicant's arguments (filed March 10, 2006) with respect to claims 1-14 have been considered but are moot in view of the previous, new and following ground(s) of rejection.

9. With regards to Claim 1, the Applicant alleges that "portions of Melchior do not disclose the claimed priority ranks". However, Melchior states the following: "For a "configure new table" command, the CAM engine also configures the table depth in terms of number of records. The table depth may take on one of 18 different values, ranging from a record capacity of approximately 64 records up to 32 million records. The RAM layout or configuration is determined by the specified key width and association width. A configuration is automatically selected to minimize the number of key words that need to be read for a seek. This can be adjusted for the word width employed in the particular embodiment of the invention" (Column 12, lines 42-51). The above art reads on the Applicant's claim, since the "configuration" in Melchior is determined by a type of priority. Therefore, the Applicant's argument is moot in view of the prior art.

10. The Applicant further alleges in reference to Claim 1, "the cited description fails to provide disclosure of the registers themselves being associated with the respective tables". However, Melchior discloses the following: "The key base register describes the base address for storage of the key in RAM, while the association base register describes the base address for storage of the association in RAM. The key base and association base are both read from the configuration section for a reconfiguration or is set after memory allocation for a new configuration. The configuration data for the first few tables are kept in registers" (Column 13, lines 35-42). Melchior also states "If the executive function 148 indicates success, the register

"association base" is set to the address returned. Otherwise, the configuration is terminated.

Both the key base and the association base are stored in the first word of the context entry for the table. A one is stored in the first word of the key storage. The remaining words are initialized to zero" (Column 14, lines 17-23). It is clear from the citation above that the registers are associated with the respective tables. Therefore, the Applicant's argument is moot in view of the prior art.

11. Further in regards to Claim 1, the Applicant alleges "portions of Melchior merely describe outputting RAM words within a range of configuration, and therefore, do not disclose outputting according in descending order of priority ranks, as claimed". However, Melchior states that "retrieving data by searching the parent table for the desired key and if that key is not found in the parent table then searching the child table for the desired key, wherein if the width of the key searched for in the parent table is less than the width of the key searched for in the child table then the key searched for in the child table is masked to the number of data bits comprising the key stored in the child table" (Column 24, lines 4-11). It is clear from the citation above that the output is done in a descending-like manner. Therefore, the Applicant's argument is moot in view of the prior art.

12. Further in regards to Claim 1, the Applicant alleges that Melchior fails to disclose "when at least one of the storage areas stores therein information matching with a word supplied from the exterior". However, Melchior states "At that clock speed, the CAM engine can provide for association matches (i.e., matches between selected stored keys and corresponding stored associations) in as little as 45 nanoseconds when the CAM engine is connected with fast SRAM memory devices" (Column 8, lines 19-23). It is clear from the citation above that the storage

areas stores therein information matching with a word supplied from the exterior. Therefore, the Applicant's argument is moot in view of the prior art.

13. Finally, in regards to Claim 1, the Applicant alleges that Melchior does not "describe using the configuration information to prioritize, in any way, CAM storage areas such that pointers to such areas would be outputted in an order that corresponds to such a prioritization". However, Melchior discloses that "This storage reduces the number of reads to find a key and is especially useful for two bank configurations when the tables are in different banks; and (4) for extra wide associations, the associations will be stored in the individually allocated portions of the CAM memory with pointers from the key words" (Column 21, lines 45-50). Since the associations are stored with pointers from the key words, and it has already been established that those items are prioritized, then the pointers to such areas would be outputted in an order that corresponds to such a prioritization. Therefore, the Applicant's argument is moot in view of the prior art.

14. Claims 2-14 are dependent on Claim 1, and therefore stand rejected.

Conclusion

15. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

16. A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37

Art Unit: 2186

CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

17. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lev I. Iwashko whose telephone number is (571)272-1658. The examiner can normally be reached on 9 Hours Schedule), from 8-4PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matt Kim can be reached on (571)272-4182. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Lev Iwashko



PIERRE BATAILLE
PRIMARY EXAMINER

4/29/06